Foreign Animal Disease Report

United States Department of Agriculture
Animal and Plant Health Inspection Service
Veterinary Services

Emergency Programs

Number 21-2/3

Summer/Fall 1993

This Issue

Emergency Programs Activities

Field Investigations. During the second quarter of fiscal year (FY) 1993 (January 1–March 31, 1993), veterinarians from the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), and the State departments of agriculture conducted 41 investigations of suspicious foreign animal diseases (FAD) in the United States to eliminate the possibility that an exotic disease may have been introduced. These investigations included 13 for vesicular conditions, 4 for exotic Newcastle disease in pet birds and poultry, 6 for avian influenza, 2 for mucosal disease, and 16 for undesignated conditions. There were 14 investigations conducted in VS' Northern Region, 17 in the Southeastern Region, 7 in the Central Region, and 3 in the Western Region.

For the first 6 months of the fiscal year, a total of 92 investigations were conducted. All were negative for FAD or pests.

Bovine Spongiform Encephalopathy (BSE) Surveillance. In addition to the above investigations, more than 955 bovine brains have been examined as a part of an ongoing BSE surveillance program. All of these tissues were negative for BSE. APHIS and the Food Safety and Inspection Service (FSIS) are conducting surveillance activities that include the submission of brains from cattle showing central nervous system signs on antemortem and/or "downer" cows that are condemned. Seven veterinarians have received specific training for BSE surveillance activities. They are working closely with FSIS personnel in slaughtering establishments that process older cattle.

Bont Ticks on St. Croix and in Puerto Rico. On May 27, 1993, the National Veterinary Services Laboratories (NVSL) (Ames, IA) reported that a tick submitted from St. Croix, U.S. Virgin Islands, was identified as *Amblyomma variegatum*. The tick was collected from a calf that was brought into a veterinary clinic. Subsequently, *A. variegatum* was found on cattle on three additional premises on St. Croix and on one premises in Puerto Rico. The tropical bont tick had previously been eradicated from both islands. Actions are currently being taken to eliminate these infestations.

Screwworms in Mexico. On May 25, 1993, APHIS' International Services (IS) reported that screwworm *(Cochliomyia hominivorax)* had been identified in the State of Veracruz, Mexico. Veracruz is approximately 300 miles south of the U.S.–Mexican border. The infestation was found in a 9-year-old cow. IS also reported that a team was sent to investigate the case to determine the source of the infestation, that a quarantine was imposed, and that emergency operations were initiated. An updated factsheet was prepared in July for distribution by VS in the United States in States along the U.S.–Mexican border.

Hog Cholera in Mexico. APHIS' IS also reported an outbreak of hog cholera in Baja California Sur, Mexico. This State had been free of hog cholera for the last 10 years. An updated factsheet was prepared in July for distribution in the United States in States along the U.S.–Mexican border.

Regional Emergency Animal Disease Eradication Organization (READEO). During the week of May 24, 1993, a workshop for the Western Region was conducted in Denver, CO. The workshop was designed primarily to prepare READEO members for the VS test exercise to be held in Montana in August and for managing outbreaks of emergency diseases simulated in the test exercise.

State Emergency Board. Principal representatives of the USDA State Emergency Board have attended a series of meetings to enhance emergency response capabilities. The sessions included an exercise, presentations, and group discussions by all agencies represented on the board. APHIS is developing a plan with the Emergency Management Institute to train APHIS State Emergency Board representatives as radiological defense officers, and to provide other courses such as training-the-trainer so that APHIS will be prepared to meet its responsibilities under Department regulations.

(Dr. M. A. Mixson, Emergency Programs, VS, APHIS, USDA, Hyattsville, MD 20782, 301-436-8073)

Foreign Animal Disease Update

This update consolidates information from Office International des Epizooties (OIE) bulletins into tables covering October through December 1992. Countries reporting disease outbreaks are listed below the appropriate disease heading (followed by the month/year of the report and total number of outbreaks reported for that time period). The notation "+" indicates that the presence of disease was reported without information on total number of outbreaks. Outbreak number followed by "+" indicates number of outbreaks as well as the presence of disease.

Foot-and-Mouth disease

Virus untyped
Argentina (1–11/92) 338
Bhutan (10/92) +
Bolivia (5–9/92) 6
Chad (6–10/92) 10+
Hong Kong (10/92) 2
India (5–7/92) 167
Iran (4–6/92) 83
Myanmar (9&10/92) 2
Nigeria (9&10/92) 3
Pakistan (8/92) +
Paraguay (10–12/92) 3
Thailand (10&11/92) 14
United Arab Emirates (1&7/92) 2

Virus O
Argentina (1–11/92) 103
Bolivia (1–3&6/92) 4
Colombia (8–11/92) 97
Ecuador (1&2,5&6,8/92) 18+
Hong Kong (10&11/92) +
Iran (4–6/92) +
Kenya (5/92) 1
Malaysia (10&11/92) 2+
Oman (7–10/92) 29
Pakistan (8/92) +
Paraguay (9–11/92) 9
Saudi Arabia (11/92) +
Thailand (9–11/92) 13
Tunisia (9–11/92) 7
Turkey (9–11/92) 81

Virus A
Argentina (1–6&8–11/92) 69
Colombia (8–11/92) 17
Iran (4/92) +
Pakistan (8/92) +
Saudi Arabia (9&10/92) +
Turkey (9&11/92) 7
Venezuela (9/92) 2

Virus C
Argentina (3&5–11/92) 39

Virus SAT 2
South Africa (8/92) 1

Virus Asia I
Malaysia (peninsula) (12/92) +
Saudi Arabia (11/92) +
Thailand (9–11/92) 40

Vesicular stomatitis

Virus untyped
Panama (9&11/92) 3

Virus Indiana
Colombia (8–11/92) 23
Costa Rica (7/92) 3
Guatemala (9/92) 1
Panama (9/92) 1

Virus New Jersey
Colombia (8–11/92) 92
Costa Rica (7/92) 6
El Salvador (7&8/92) 3
Guatemala (8&9/92) 5
Honduras (7&8/92) 12
Mexico (9–11/92) 24
Nicaragua (8/92) 1
Venezuela (10/92) 1

Swine vesicular disease
Belgium (10/92) 1
Italy (10–12/92) 10
Netherlands (7&9/92) 12

Rinderpest
India (5–7/92) 12
Oman (9/92) 1
Saudi Arabia (11/92) 1
United Arab Emirates (2&6/92) 2

Bluetongue
India (6/92) 1
South Africa (9–11/92) +
United States (8–12/92) +

Fowl plague
Senegal (8&9/92) +

Newcastle disease

Virus not characterized
Albania (9–10&12/92) 5
Argentina (1–11/92) +
Chad (6–10/92) +
Congo (8&9/92) +
Cote-d'Ivoire (1–11/92) +
Egypt (6–9/92) 4
Germany (11/92) 2
Ghana (1–7/92) 134
Guinea (10–12/92) +
Hong Kong (8/92) 1
India (5–7/92) 199
Iran (4–6/92) 119
Madagascar (3–5/92) 7
Malawi (1–9/92) 33+
Malaysia (peninsula) (9–11/92) 3
Mexico (9&10/92) 3
Mozambique (10–12/92) +
Myanmar (11/92) 1
Netherlands (9–11/92) 32
Pakistan (8/92) 1
Philippines (9&10/92) +
Portugal (10/92) 1
Senegal (8&9/92) +
South Africa (9–11/92) 10
Thailand (8&9/92) 3
Tunisia (11/92) 1
Turkey (9–11/92) 16
United Arab Emirates (2&4/92) 3
Yugoslavia (10/92) 1
Zaire (9/92) +

Velogenic virus
Belgium (11/92) 2
Canada (7/92) 1*
France (12/92) 12**
Haiti (1–9/92) +
Hungary (10/92) 1
Indonesia (1–6/92) +
Kenya (6–9/92) 5
Korea (9–11/92) 4
Mexico (9/92) 1
Thailand (8/92) 2
United States (6–8&11/92) 10***

* Wild young herring gulls, cormorants, and terns (VNND)
** Ornamental birds
*** Wild waterfowl and one turkey premises (VNND)

Rift Valley fever
Mozambique (10–12/92) +
Zambia (7/92) +

Sheep and goat pox
India (5–7/92) 33
Iran (4–6/92) 67
Israel (12/92) 32
Israel (Controlled Territories) (11&12/92) 6
Libya (1–9/92) +
Morocco (10&12/92) 5
Oman (7–10/92) 24
Senegal (8/92) 3
Tunisia (8–11/92) 100
Turkey (9–11/92) 39
United Arab Emirates (1,3&8/92) 3

Peste des petits ruminants
Cote-d'Ivoire (3&8/92) 3
Ghana (1/92) +
Guinea (10–12/92) +
Nigeria (8–10/92) 5
Oman (7–10/92) 47
Senegal (8&9/92) 5
United Arab Emirates (7/92) 1

African swine fever
Angola (4&7/92) 5
Congo (8/92) +
Italy (10–12/92) 25
Malawi (1–3&5–8/92) 29
Mozambique (10–12/92) +
Senegal (8&9/92) +
Spain (10/92) 4
Zaire (9/92) +

African horse sickness
Mozambique (10–12/92) +
Senegal (8&9/92) 3
South Africa (9–11/92) +
Zimbabwe (11/92) 1

Hog cholera
Argentina (1–11/92) +
Austria (12/92) 1
Belarus (9/92) 1
Bulgaria (10&11/92) 5
Chile (8–10/92) 5
Colombia (9–11/92) 11
Croatia (11&12/92) 4
Czech & Slovak Republics (10&11/92) 6
Germany (11&12/92) 5
Hungary (10&11/92) 5
India (5–7/92) 9
Italy (10&12/92) 7
Korea (9–11/92) 9
Latvia (1,2&4/92) 8
Lithuania (11/92) 2
Madagascar (5/92) 4
Mexico (9–11/92) 7
Myanmar (9&11/92) 2
Netherlands (5&6/92) 6
Paraguay (9&10/92) 2
Poland (10/92) 7
Slovenia (10&11/92) 18
Taipei China (10&12/92) 5
Thailand (9/92) 2
Yugoslavia (9/92) 1

Contagious bovine pleuropneumonia	Lumpy skin disease
Angola (1–5&7/92) 21	Botswana (9/92) +
Chad (6/92) 1	Israel (Controlled Territories) (11/92) 1
Cote-d'Ivoire (2–5/92) 4	Madagascar (3–5/92) 59
Guinea (10–12/92) +	Malawi (1–9/92) 73+
Italy (10&12/92) 4	Namibia (10/92) 1
Kenya (6–8/92) 6	Nigeria (11/92) 2
Nigeria (8–11/92) 10	Reunion (9&10/92) 3
Spain (10/92) 1	South Africa (9–11/92) +
	Zaire (9/92) +

(Dr. Rob Tanaka, IS, APHIS, USDA, Hyattsville, MD 20782, 301-436-8892)

Screwworm Update—Mexico

The screwworm outbreak continued after the rainy season with a new detection on May 21, 1993. Since that case, five positive samples were collected with the latest collection in the second quarter of 1993 occurring on June 17. This resurgence of the outbreak was thought to be due to a low population level that persisted below a detectable threshold in the Panuco River area. Currently about 25 million sterile flies per week are released in the outbreak area in Mexico.

Plans to expand the program in Nicaragua with the scheduled release of sterile flies on July 16, 1993, have been further delayed due to the outbreak in Mexico. The Nicaragua program is now more than a year behind schedule.

Future plans include signing agreements with Costa Rica and Panama later this calendar year.

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Bovine Spongiform Encephalopathy (BSE) Update

Since February 26, 1993, Great Britain (England, Scotland, and Wales) has had 9,880 newly confirmed cases of BSE with 1,744 more herds affected (previous totals were 85,556 cattle and 23,915 herds). About 45 percent (up from 42 on February 26) of the dairy herds and 9.5 percent (up from 8.1) of the beef suckler herds in Great Britain have been affected (table 1). Dr. J. Wilesmith, Epidemiology Department, Central Veterinary Laboratory, Surrey, England, states that fewer newly infected herds are being reported in Great Britain, and the incidence rate is decreasing in cattle born in Great Britain since the 1988 ban on feeding ruminant-derived proteins to ruminants.

During the period March through May 1993, 79 additional confirmed cases of BSE have been reported from Northern Ireland, while the Republic of Ireland had 4 and Switzerland had 7 (table 2).

A total of 955 U.S. bovine specimens were submitted for BSE examination between May 1, 1990, and April 30, 1993. The Centers for Disease Control and Prevention (CDCP) examined 163, NVSL examined 384, and various nonfederal veterinary diagnostic laboratories examined 408. To date, no evidence of BSE has been found in any U.S. cattle (fig. 1).

Table 1—Bovine spongiform encephalopathy: descriptive epidemiological statistics for Great Britain* as of June 4, 1993

Total number of confirmed cases	96,436
Total number of affected herds	25,659
Proportion of dairy herds affected	44.6%
Proportion of beef suckler herds affected	9.5%

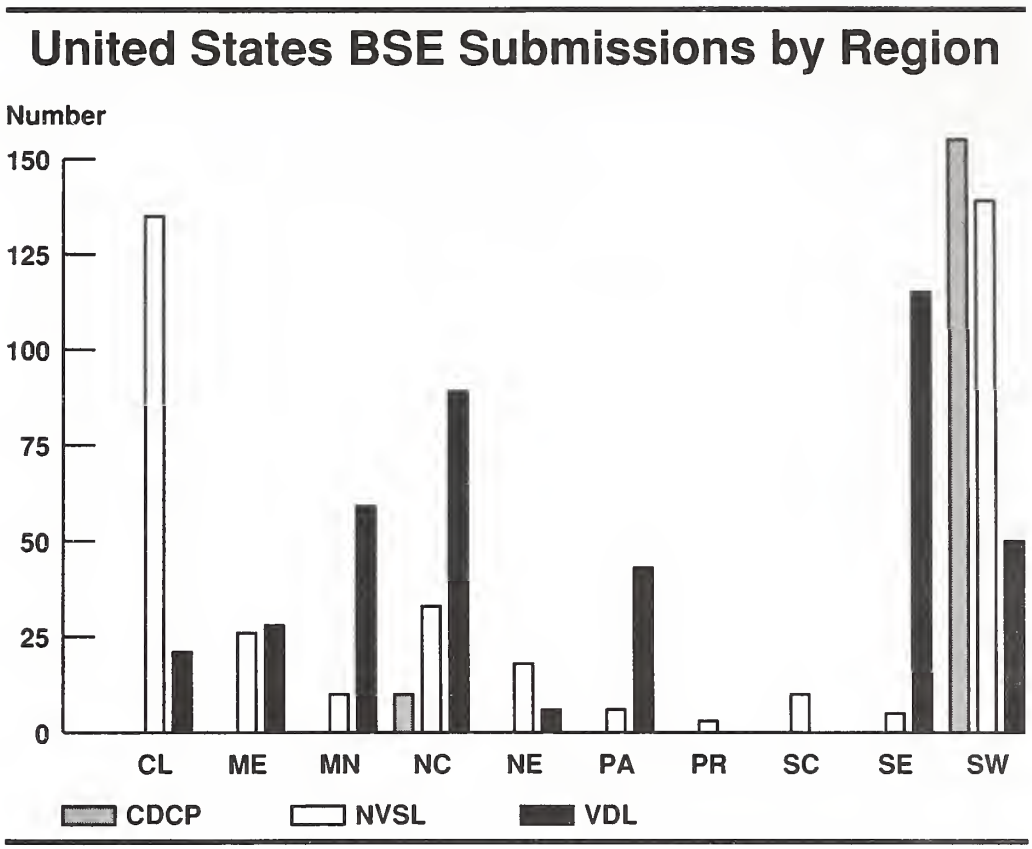
* England, Scotland, and Wales

Table 2—Other countries affected by BSE

Country	Imported cases	Native cattle	No. of cases	Date of last report
Northern Ireland	Yes	Yes	834	3 Jun 93
Republic of Ireland	Yes	Yes	72	31 May 93
Switzerland	No	Yes	36	4 Jun 93
France	No	Yes	5	31 Jul 92
Oman	Yes	No	2	31 Jul 92
Falkland Islands	Yes	No	1	4 Sep 92
Denmark**	Yes	No	1	10 Aug 92

** BSE has been subsequently eradicated. Denmark is free of BSE.

Sources: Dr. O. Denny, Northern Ireland; Dr. A. Doherty, Republic of Ireland; Dr. B. Hornlimann, Switzerland; Dr. J. Wilesmith, Great Britain.



Regions:

CL	Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, Ohio
ME	Delaware, Kentucky, Maryland, Virignia, West Virginia
MN	Colorado, Idaho, Montana, Nevada, Utah, Wyoming
NC	Michigan, Minnesota, North Dakota, South Dakota, Wisconsin
NE	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont
PA	California, Oregon, Washington
PR	Puerto Rico, Virgin Islands
SC	Arkansas, Louisiana, Mississippi
SE	Alabama, Georgia, North Carolina, South Carolina, Tennessee
SW	Arizona, New Mexico, Oklahoma, Texas

Figure 1—Total submissions in the United States for BSE surveillance, May 1990–April 1993, by region. CDCP = Centers for Disease Control and Prevention (Atlanta, GA), NVSL = USDA, APHIS, VS' National Veterinary Services Laboratories (Ames, IA), and VDL = Nonfederal veterinary diagnostic laboratories.

[This article was extracted from the Dx Monitor, Summer 1993, USDA, APHIS, VS, Centers for Epidemiology and Animal Health, Fort Collins, CO.]

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Avian Influenza in the Northeastern United States—January 1992 Through May 1993

In January 1992, a turkey flock in Pennsylvania was determined to be serologically positive for H5N2 avian influenza (AI) infection (see Foreign Animal Disease Report, vol. 21, no. 1, spring 1993). An epidemiologic traceback implicated a live-poultry market in Philadelphia, PA. A nonpathogenic H5N2 AI virus was isolated from chickens at the market. This situation prompted the formation of a joint cooperative AI surveillance effort between USDA, APHIS, VS, and the departments of agriculture in several Northeastern States.

This surveillance effort involved sampling live-poultry markets and backyard flocks for virus isolation and serology. As of May 7, 1993, identification of nonpathogenic H5N2 AI virus is as follows:

Virus isolation		Positive serology	
Live-bird market	**Backyard flock**	**Live-bird market**	**Backyard flock**
Florida (1)	New Jersey (1)	New Jersey (1)	Delaware (2)
New Jersey (5)	Pennsylvania (1)	Pennsylvania (1)*	Maryland (2)
New York (11)			Michigan (1)
Pennsylvania (1)			New Jersey (1)
			Pennsylvania (5)
			Virginia (1)

* Turkey flock

Two management scenarios evolved: either seropositive flocks or flocks where the virus was isolated were depopulated and their premises were cleaned and disinfected, or premises were placed under quarantine and the flocks were retested for virus at 15- to 30-day intervals. Sentinel birds were also placed in live-poultry markets and botanicas in Florida. Since January 1993, sentinel birds from three botanicas have tested positive on serology or virus isolation.

It is important to note that the virus isolate is a nonpathogenic H5N2 AI. There has been no significant clinical illness associated with this virus. In addition, it was detected only in small backyard flocks and live-poultry markets. Other than the initial serologically positive turkey flock, there has been no involvement of commercial poultry operations in the United States. Production facilities raising commercial broiler chickens and layers have remained free of H5N2 AI infection.

Research by Dr. Robert Webster, St. Jude Children's Research Hospital, Memphis, TN, has determined that the viruses may have originated from waterfowl. Four nonpathogenic H5N2 AI viruses isolated from waterfowl in the Delaware Bay area were closely related antigenically and molecularly to the virus recently isolated from live-bird markets. The significance of this finding is unknown. The researcher feels that nonpathogenic H5N2 viruses are probably endemic in migrating waterfowl and can be identified wherever routine surveillance is carried out. This large reservoir of virus could perhaps provide the opportunity for the maintenance and emergence of new and possibly highly pathogenic AI virus through mutation or genetic reassortment. Because of this threat, surveillance and research efforts are ongoing to determine the extent and characterization of the virus.

Since no new virus isolations have been made, State import restrictions on poultry and poultry products have been lifted in the affected States. Two South American trade embargoes are still in place; Argentina, in response to the scientific evidence, has lifted most import restrictions on U.S. poultry breeding stock and poultry products.

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Foot-and-Mouth Disease (FMD) in Italy

After being free of FMD for nearly 4 years, Italy isolated FMD in the Potenza province, Basilicata region, in the southern part of the country on February 28, 1993. Although the source of the FMD is undetermined, its introduction is believed to be related to the importation of cattle from Croatia. As of June 21, 1993, there have been 57 outbreaks of FMD reported, most of which occurred in southern Italy (fig. 1). In addition, there have been four outbreaks in the Veneto region in northern Italy including Verona. However, these four outbreaks have been attributed to movements of animals from the primary focus of infection in southern Italy.

Figure 1—Location of the 57 outbreaks of foot-and-mouth disease reported in Italy as of June 21, 1993.

The FMD virus has been characterized as subtype O_1, a Middle Eastern strain. Animals affected by the outbreak include sheep and goats, cattle, swine, and buffaloes (table 1). More than 8,000 head of livestock have been destroyed because of the outbreak (table 2).

Table 1—Animals present in Italy's FMD outbreak, spring 1993

Region	Provinces	Outbreaks	Cattle	Swine	Sheep/ goats	Buffaloes
Basilicata	2	25	347	792	3,467	8
Campania	3	14	135	35	388	68
Calabria	2	10	238	89	235	0
Puglia	1	4	76	0	3	0
Veneto	1	4	2,458	0	6	0
Total	**9**	**57**	**3,254**	**914**	**4,234**	**76**

Source: Thirtieth Session of the European Commission for the Control of Foot-and-Mouth Disease, April 27–30, 1993.

Table 2—Number of animals slaughtered because of FMD, by species

Species	Animals slaughtered			Total	Total indemnities
	Infected		Suspects	Total	
					*$ U.S.**
Cattle	3,225	(39.8%)	603	3,828	7,300,700
Swine	906	(11.2%)	2,494	3,400	864,590
Sheep	3,247	(40.1%)	244	3,491	443,740
Goats	646	(8.0%)	0	646	82,140
Buffalo	76	(0.9%)	0	76	87,000
Total	**8,100**	**(100%)**	**3,341**	**11,441**	**8,778,170**

* These dollar figures were converted from the source document, which recorded monetary amounts in lire. At press time, the exchange rate was 1,573 lire = $1 U.S.

Source: Thirtieth Session of the European Commission for the Control of Foot-and-Mouth Disease, April 27–30, 1993.

Animal health authorities in Italy responded quickly to impose control measures. These measures included increased restrictions on the movement of live animals and animal products as well as stricter border inspections. Extensive epidemiological monitoring has provided prompt information on the outbreak and has helped identify and control infected premises. Control measures were also imposed at animal concentration points such as markets, fairs, and exhibitions.

As of April 22, 1993, the cost of the outbreak to the Italian government was estimated at 13 billion lire ($8.26 million U.S.) for indemnity funds, and 5 billion lire ($3.2 million U.S.) for cleaning, disinfection, and carcass disposal. Indirect costs, including the disruption of livestock marketing and trade, may exceed the direct cost by as much as tenfold. These figures can be compared with a reported average annual cost of 23 billion lire ($14.6 million U.S.) for previous FMD vaccination programs in Italy. Vaccination for FMD was discontinued there on August 11, 1991.

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Future Policies for Eradication of FMD in North America

Foot-and-mouth disease is the most contagious disease known to livestock. North and Central America, New Zealand, Australia, Japan, Chile, the Scandinavian countries, and the United Kingdom are free from FMD today. However, because FMD is endemic in parts of Africa, Asia, and South America, it is important that there be policies in place that can be immediately implemented should an outbreak occur in the "free" areas.

Outbreaks of FMD have occurred in the United States nine times. The traditional method of eradication has been slaughter alone. While environmental regulations for carcass disposal, animal welfare concerns, and today's value of animal protein and genetic lines are incentives against the use of widespread slaughter, the policy today still indicates that quarantine and slaughter should be the first steps in control of FMD.

Countries free of FMD have significant trade advantages because FMD is a major impediment on movement of red meat products, products that contain ingredients of animal origin, and live domestic ruminants and swine. There are other economic benefits: FMD-free areas do not need to produce or buy vaccine or maintain a large

cadre of regulatory personnel to apply vaccines as a regular component of FMD control. Countries free of FMD must remain vigilant to protect their status and prevent devastating losses. FMD is a vesicular disease affecting domestic ruminants and swine as well as numerous wild animal species such as elephants, nutria, grizzly bears, and wild ruminants. Surveillance by well-trained private and regulatory veterinarians is necessary to detect FMD rapidly in an FMD-free country. Because of its contagious nature, FMD could affect nearly 100 percent of exposed animals. The economic impact of FMD on the United States is currently estimated at $20 billion if the disease were to become endemic for 15 years.

Preventive measures for FMD include trade restrictions on the importation of biologicals, livestock, and red meat products from areas with endemic FMD. Officials must control the movement of visitors from parts of the world where FMD is present and must be knowledgeable about areas of the world where FMD is endemic.

For areas where FMD is not immediately controlled with the use of quarantine and slaughter, vaccination is a valuable adjunct to protect potential contact animals during an outbreak. The virus causing FMD has 7 serotypes and more than 70 subtypes. (A subtype is a variant within a serotype that is antigenically different and requires a unique vaccine.) Today there are about 15 subtypes of the 7 serotypes of FMD virus active in the world livestock population.

The most commonly used vaccine for FMD is an azuridine inactivated product made from large-scale suspension cell cultures. Modified live vaccines are not in general use because they may revert to virulence. Genetically engineered, subunit, and peptide-based vaccines are presently not commercially available, although experiments have shown them to be efficacious for certain virus subtypes. Empty capsid vaccines, where the nucleic acid is not present, are being discussed as the ultimate potential synthetic vaccine of the future. Such products could be made through recombinant DNA technology in U.S. mainland facilties for export. Such export facilities would provide a potential source of such vaccines on the U.S. mainland in case of an emergency.

The availability of vaccine for adequate intervention in case of an outbreak of FMD in the United States would require storage of large volumes of vaccine in vaccine banks. With the exception of England, countries free of FMD do not have active FMD vaccine-production facilities because they would present a substantial risk to the locale. FMD virus has escaped from vaccine-production facilities and laboratories on several occasions.

The North American Foot-and-Mouth Disease Vaccine Bank was established in 1982. This consortium of the United States, Mexico, and Canada stockpiles cryopreserved concentrated FMD vaccine antigen but only in limited supplies for use in these countries. Vaccine concentrates are obtained from commercial sources following a bidding process. The cell cultures, vaccine virus master seeds, and facilities used for production must comply with USDA APHIS' biologics licensing requirements. To enter the bank, the vaccine concentrate must pass tests by the producer and by USDA scientists at the Foreign Animal Disease Diagnostic Laboratory on Plum Island. Redundant tests are performed to assure purity (freedom from extraneous organisms), safety (lack of live FMD virus in the product), efficacy (protection against virulent FMD challenge inoculation), and potency (adequate antigen levels to withstand storage and processing). Annually, random samples of antigen concentrates are tested to measure the integrity of the antigen and to assure that the product is not deteriorating and remains useful. If there were a need to convert the vaccine concentrate into vaccine, the final steps would take place in a USDA-approved facility.

There are about 12 million doses of vaccine stored as concentrate in the bank, representing 3 serotypes and 7 subtypes. There are about 100 million cattle, 100 million swine, and 20 million sheep and goats in the United States. Livestock populations are about 28 percent of U.S. totals in Mexico and 11 percent in Canada. The target hosts far outnumber the doses of vaccine in the bank.

Normally, biological products produced outside North America are not used in North American livestock. Since there is no FMD vaccine producer on this continent, the nations of North America must turn to foreign suppliers. Current policy for approval of FMD vaccines produced in foreign countries for use on the North American continent requires an elaborate safety test conducted at the Foreign Animal Disease Diagnostic Laboratory on Plum Island using animal inoculation.

Under emergency conditions, where millions of doses of FMD vaccine could be required, it would not be possible to safety-test the number of batches or serials of vaccine that would be needed to provide vaccine in a timely manner. Therefore, consideration is being given to certification of foreign firms for the production of FMD vaccines. Certification would allow the use of FMD vaccines during an emergency in North America without further safety testing of each production batch prior to importation. To retain certification, a firm would undergo random inspections for compliance with USDA vaccine-production guidelines, adequate biocontainment, and good manufacturing practices. Random tests for safety, potency, purity, and efficacy of currently produced FMD vaccines could be performed.

The European Economic Community (EEC) is seeking FMD-free status and prohibited FMD vaccination effective January 1992. Consequently, the EEC has diminished the number of laboratories working with FMD virus. There is now only one firm producing FMD vaccine in Europe. The loss of the availability of FMD vaccine, subsequent loss of technical expertise, and decreased production capacity will need to be addressed by the EEC and the North American FMD Vaccine Bank.

International organizations such as the OIE and the Food and Agriculture Organization of the United Nations may have to assist in developing vaccine production for emergency use. Uniform guidelines and standards for vaccines are currently being discussed by the international community. The OIE has recently published a book on guidelines for vaccines, including FMD vaccines. The international movement of FMD vaccine from a commercial operation in an FMD-infected area to an FMD-free area will require strict compliance with international production and safety guidelines.

Vaccine banking offers a means to have only limited amounts of vaccines for FAD readily available. Other diseases that are candidates for vaccine banking are African horse sickness, rinderpest, Rift Valley fever, and hog cholera. These diseases recur periodically, and vaccines may not be readily available for emergency use.

In the future, global control and eradication of FMD and other FAD may employ new policies. A combination of disease eradication by slaughter, the provision of vaccine from vaccine banks, and agreements for obtaining large volumes of vaccine from internationally acceptable production facilities may be the new continency measures for regulatory veterinary medicine.

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Swine Vesicular Disease (SVD) in Spain

In the summer of 1992, the Spanish Ministry of Agriculture was informed that Holland had recently exported to Italy live swine that were subsequently diagnosed with SVD. In response, Spain prohibited the importation of all live swine from the Netherlands except for consignments for immediate slaughter. An epidemiological investigation was undertaken of all Spanish farms that imported swine from the Netherlands from the time the Netherlands reported SVD through September 1992 (when the ban on live swine was implemented). This investigation began on November 20, 1992. In all, 94 farms in 39 different towns had imported such pigs.

Only one farm, in northeastern Spain in the town of Os de Balaguer, Lérida province, had positive serological results (2.3 percent or 7 of 310 swine tested). All swine on the property were depopulated.

In February 1993, an outbreak of a vesicular condition was reported on a swine farm in the town of Vallfogona de Balaguer, Lérida province, 10.5 miles (17 km) away. Laboratory confirmation of SVD was reported on February 16, 1993, and the entire herd (1,009 head) was slaughtered and buried. Spanish animal health authorities imposed quarantine, surveillance, and protection zones in accordance with EEC guidelines. None of the swine on this feeder operation originated in the Netherlands; they came from a farm in Zamora province in northwestern Spain. Swine on the farm in Zamora were tested for SVD with negative results.

Spanish veterinary officials believe that SVD virus was transmitted from the Os de Balaguer farm containing the Dutch swine to the Vallfogona de Balaguer farm by personnel or feed trucks. The same enterprise provided both farms with feed and veterinary care, and the same personnel and feed trucks entered and left both properties.

In April 1993, swine at two additional farms in the Huesca province, Aragón autonomous region, in northeastern Spain were diagnosed with SVD. All swine on these farms (a total of 3,278 head) were depopulated.

Spanish authorities believe that Spain is now free of SVD. The last outbreak occurred in early April 1993, and no evidence of the disease has been found since. More than 10,000 swine tested for SVD in Spain since the outbreak have been found disease free.

The Spanish borders were opened on May 6, 1993, for imports of live pigs from the Netherlands. Spanish authorities have carried out random testing on all animal lots imported and report 100-percent negative results. No evidence of SVD has been found in any tests conducted.

[This summary was abstracted from memoranda by Dr. Mark P. Dulin, Area Director, Region IV, IS, APHIS, USDA; and Mr. Edmund Nichols, Minister-Counselor for Agricultural Affairs, Foreign Agricultural Service, USDA, Madrid.]

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245

Regionalization and Risk Analysis: a New Paradigm for World Trade

The early part of this century found the United States affected by repeated incursions of exotic animal disease agents. The resulting losses led to the Tariff Act of 1930. This Act specifically forbade imports of animals or animal products from a country known to have FMD or rinderpest. From this, the "country freedom" strategy for importation developed. This strategy requires that an exporting country be examined and declared "free" or "not free" of certain livestock disease agents before an animal or commodity can be exported. The goal was "zero risk." This strategy continues today as the primary means of guiding U.S. import policies.

Zero-risk policies have been successful in keeping exotic disease agents out of the United States, and these concepts are reflected in trading practices of many other countries. When these policies were first developing, veterinary diagnostic capabilities were less advanced than at present, so these historical policies were adequate for their purposes. However, in an increasingly open world trade market, demand is being made for clear and defensible biological explanations when commodities are prohibited from moving from one country to another. Any country that ignores this new reality stands to suffer economic harm from exclusion in world agricultural trade.

The "country free" doctrine of permitting imports has had some unfavorable effects. Without consistent, documented, and transparent scientific review, it has been increasingly difficult to sort out which policies are legitimately necessary for biological reasons. In addition, the "country free" doctrine has lulled officials into believing that this is equivalent to "risk free."

There are other reasons to reconsider these historical trade policies. First, more frequent and expedient world travel has made the transfer of goods more common. Interest in importing and exporting animals and commodities is increasing rapidly. Second, there is no situation with zero risk in biological systems. Manipulation of any biological system inherently involves risk. For example, extremely restrictive import policies with no legal recourse invite smuggling, thus introducing unknown hazards that may not be traceable should the hazardous event occur. These unknown hazards may lead to risks that are less easily contained than are known ones. Third, agents of disease are never homogeneously distributed. Geography, climate, host range boundaries, and husbandry practices are important determinants of agent and disease distribution. Finally, trade agreements such as the General Agreement on Tariffs and Trade (GATT) and the proposed North American Free Trade Agreement (NAFTA) require that these factors of geography, climate, etc., be considered in developing import policies.

Regionalization is the concept that is likely to supplant the "country free" strategy. Regionalization requires that decisions about the safety of a proposed import be based not on country boundaries but rather on the part of a country or parts of adjacent countries from which an import will be generated. A region may be as small as a single premises or as large as a group of countries for a particular exportation event or a general trading consortium. The collection of countries that make up the EEC is an example of the latter. Once the doctrine of regionalization is established and country borders are no longer used to delineate bounds for international trade, new approaches for making judgments about the safety of imported animals and animal products must be available to maintain healthy national herds. That approach is risk analysis.

Risk analysis is a relatively new field that makes use of information from many disciplines in order to estimate the frequency of occurrence of an unwanted event and to manage and communicate about that event. Risk analysis is comprised of three parts: risk assessment, risk management, and risk communication.

Risk assessment is a tool that involves identification of a hazard (a qualitative description of what can go wrong) and a quantitative statement of the likelihood and the impact of the hazardous event, should it occur. Once a risk assessment for a particular importation is completed, the decision to accept a particular level of risk, to require risk mitigation measures, or to refuse the importation altogether is the responsibility of risk management. Risk communication involves the discussion of the import risk through the process among all concerned parties.

In the new climate for world trade, a risk assessment must be transparent. That is, the information used in making the decision must be carefully organized and laid out for all to view. It must be consistent. That is, the standards for evaluation developed for one risk assessment must be the same standard used for all. The risk assessment must carefully document all information used in conducting the evaluation. The assessment should be flexible to take into account new information about changes in animal health status for the exporting region and new facts as they come to light.

In order for regionalization to succeed while maintaining international animal health, trading decisions must be based on careful evaluation of biological risk assessments. All trading partners must be subjected to the same scrutiny, using the same standards. If the risk is considered too high after completing a risk assessment for a particular import, consideration should be given to risk mitigation measures. For example, can favorable results of a diagnostic test of the animals to be imported lower the risk to an acceptable level? Could treatment of an animal product bring an unacceptably high risk for a proposed import down to an acceptable level? Are the mitigation measures appropriate? Restriction beyond what is needed for biological safety can backfire. Blocking a legal method of importation encourages smuggling and other illegal activity, raising risk to unknown and potentially unacceptable levels.

Developing systems that are accepted by all international trading participants and that evaluate all scenarios by the same criteria is an exciting challenge. The potential benefits are numerous. Regionalization and risk assessment require maintaining good animal health and the records and information to demonstrate that status. Such records management can lead to strengthened animal health infrastructures, improved national herd safety, and improved veterinary capabilities worldwide. Preservation of genetic diversity and breed improvement would be facilitated. Human health, particularly in developing countries, would benefit from an increased supply of protein and a decrease in zoonotic disease.

These outcomes require international cooperation for a number of activities. Particularly important is the sharing of animal health information, the development of consistent approaches to regionalization and risk assessment, and the training and education of veterinarians worldwide. The challenge is to implement these ideas for facilitating free international trade while maintaining healthy national herds. The keys to this success are regionalization and risk analysis.

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Errata

In the article "Significant Diseases of Somalia, East Africa," in the East Coast Fever section, Spring 1993, Number 21-1, page 17, the fourth sentence should read, "In addition, most ticks are *able* to survive for long periods without a host." In the Heartwater section of the same article, the sixth sentence should read, "However, the *heartwater organism* is extremely fragile and cannot persist *outside of* a host for more than a few hours".

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☆U.S. Government Printing Office : 1993 - 300-050/81640